

5.2 Probability and Odds

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9:42 AM

ex roll a dice 12 times, twice we rolled a 6.

$$P(6) = \text{probability of rolling a 6} \\ = \frac{2}{12} = \frac{1}{6}$$

$$P(6') = \text{probability of not rolling a 6} \\ = \frac{10}{12} = \frac{5}{6}$$

$$\text{Odds in favour} = \frac{P(A)}{P(A')} = \frac{\text{prob. that A occurs}}{\text{prob. that A does not occur}}$$

$P(A) : P(A')$

 (will:won't)

ex continued

Odds in favour of rolling a 6

$$\frac{1}{5} = \frac{2}{10} = \frac{3}{15}$$

same

$$\frac{1}{6} : \frac{5}{6}$$

$$\left. \begin{array}{l} 1:5 \\ 2:10 \\ 3:15 \end{array} \right\} \text{same}$$

$$\begin{aligned} \frac{\frac{1}{6}}{\frac{5}{6}} &= \frac{1}{6} \div \frac{5}{6} \\ &= \frac{1}{6} \times \frac{6}{5} \\ &= \frac{1}{5} \\ &1:5 \end{aligned}$$

$$\text{Odds Against} = \frac{P(A')}{P(A)} = \frac{\text{prob. won't occur}}{\text{prob A will occur}}$$

Odds Against:

$\overline{P(A)}$ - prob A will occur.

$P(A') : P(A)$

(won't:will)

ex continued

odds against rolling a 6

odds for was 1:5

odds against is 5:1

Odds and Probability are linked:

If the odds in favour of A occurring are $m:n$
then the odds against are $n:m$ and

$$P(A) = \frac{m}{m+n}$$

ex continued

$m = \# \text{ of times } 6 \text{ was rolled} = 2$

$n = \# \text{ of time other \#s were rolled} = 10$

(12 rolls in total)

$$P(6) = \frac{2}{2+10} = \frac{2}{12}$$

$$\begin{aligned} P(A') &= \text{the complement of } P(A) \\ &= 1 - P(A) \end{aligned}$$

or $P(A) + P(A') = 1$

See text examples pg 305-308

Practice pg 310 # 1-11, 14, 17-19